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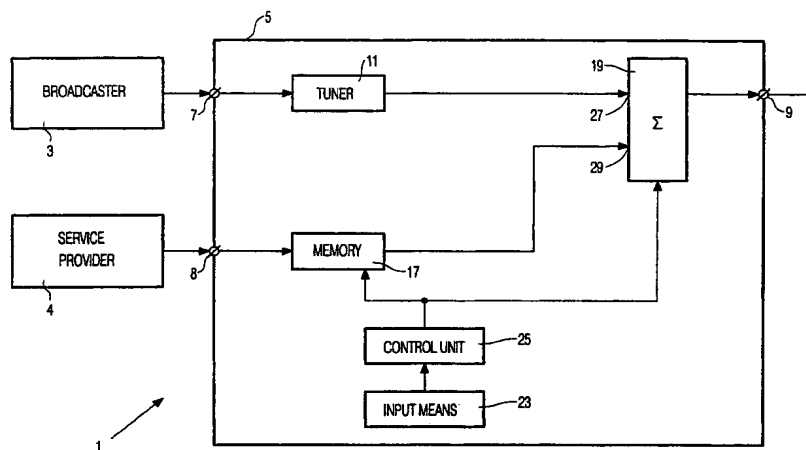
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(54) Title: TV SIGNAL RECEIVER



(57) Abstract: The invention relates to a TV signal receiver (5) having a first input terminal (7) for receiving a first input signal, a tuner (11) for deriving a first TV signal from the first input signal. Said first input signal comprises interruptions interrupting said first TV signal. The TV receiver (5) further comprises a second input terminal (8) for receiving a second input signal, a storage device (17) for storing and reading at least a plurality of second TV signal blocks in/from a memory, whereby said second TV signal blocks are derived from the second input signal. Control means (25) are provided for generating a first control signal for controlling the storage device to read at least one second TV signal block from the memory to obtain a second TV signal. A signal combination unit (19) is provided for replacing a part of the first TV signal by the second TV signal so as to obtain a composite TV signal in response to said first control signal. The composite TV signal is applied to an output terminal (9). The TV signal receiver further comprises user activatable input means (23) for receiving a command from a user to insert a second TV signal block in the first TV signal.

TV signal receiver.

The invention relates to a TV signal receiver having a first input terminal for receiving a first input signal, a tuner for deriving a first TV signal from the first input signal, wherein said first input signal may comprise interruptions interrupting said first TV signal, a storage device for storing and reading at least a plurality of second TV signal blocks in/from a memory, control means for generating a first control signal for controlling the storage device to read at least one second TV signal block from the memory to obtain a second TV signal, a signal combination unit for replacing at a part of the first TV signal by the second TV signal so as to obtain a composite TV signal in response to said first control signal, and further having an output terminal for supplying the composite TV signal.

A TV receiver defined above is known from WO-98/36563 (PHN 16.230). The known TV receiver receives a first TV signal. Said first TV signal comprising TV programs of a given length are regularly interrupted by, for example commercials or other information. The TV receiver is further arranged for receiving and storing a plurality of second TV signal blocks. The second TV signal blocks could comprise commercials being preferably commercials about products in which they are especially interested, information about other subjects such as, for example stock exchange news or the weather forecast or other information. The known TV receiver automatically replaces an interruption in the first TV signal by a second TV signal block. Second TV blocks will replace so all interruptions, even if the content of an interruption is of special interest for the viewer. On the other hand, second TV blocks that are not of special interest for the viewer, are supplied to the output completely.

It is an object of the present invention to provide a TV signal receiver with which it is possible to combine the first TV signal with a second TV signal blocks if requested by the user.

The TV signal receiver in accordance with the invention is characterized in that the TV signal receiver comprises a second input terminal for receiving a second input signal,

whereby the storage device is adapted to derive second TV signal blocks from the second input signal and for storing said second TV signal blocks in the memory, and user activatable input means for receiving a first command to be supplied to the control means in order to generate the first control signal.

5                   In this way, the user can determine when a second TV signal block, which is received via a second input terminal and which comprises commercials or other information, will be supplied to the output terminal.

                  In an embodiment of the TV signal receiver the TV signal receiver is characterized in that the storage device is further adapted to read at least one second TV signal  
10                   block in dependence of a user profile. The user profile can be obtained via the input means. But the user profile could also be generated from the behavior of the user when viewing interruptions in the first TV signal. So indicates the behavior of viewing the whole interruption from a certain type, that said type of interruptions is of interest for the viewer and indicates the behavior of viewing only a part of said interruption, that said type of interruptions is not so  
15                   interesting for the viewer. The detected type of said interruptions or second TV signal blocks is used to generate the user profile. The user profile is used to optimize the selection of the desired content of second TV signal block to be supplied to the output terminal.

                  In a further embodiment of the TV signal receiver the TV signal receiver is characterized in that the user activatable input means are adapted for receiving a second  
20                   command to be supplied to the control means in order to generate a second control signal, and the storage device is further adapted to stop reading the at least one second TV signal block from the memory and to read at least another second TV signal block from the memory in dependence of the second control signal. In this way, a second TV signal block supplied to the output that is not of interest for the viewer, can be replaced by another second TV signal  
25                   block. This action by the viewer can be used for further optimizing the user profile.

                  Moreover, the TV signal receiver may be provided with third detection means for detecting an event whereby said first TV signal is continued after an interruption while a second TV signal block is read from the memory and output means for generating an indication signal in dependence of the detection of said event. By detection of this event the  
30                   viewer can be informed that the interruption if the first TV signal has ended and that the program in the first TV signal is resumed. The viewer can decide to view the whole second TV signal block and then resume viewing the program in the first TV signal or to stop viewing the second TV signal block and directly resume viewing the program in the first TV signal.

The TV signal receiver may further be provided with a second memory, writing means for storing the first TV signal in said second memory, and reading means for reading a delayed version of the first TV signal from said second so as to enable a delayed supply of said first TV signal to said signal combination unit. The possibility to delay the first TV signal has the advantage for the viewer to view the whole second TV signal block and to resume viewing the program following the replaced interruption in the first TV signal. After supplying the second TV signal block to the output, a delay version of the first TV signal is supplied to the output.

These and other aspects of the invention will be apparent from and elucidated with respect to the embodiments described hereinafter in the figure description in which

Figure 1 shows a first embodiment of a system provided with a broadcaster, a service provider and at least one TV signal receiver according to the invention,

Figure 2 shows a second embodiment of a system provided with a broadcaster, a service provider and at least one TV signal receiver according to the invention, in which a profile of desired second TV signal blocks is generated and made known to the service provider,

Figure 3 shows a third embodiment of a system provided with a broadcaster, a service provider and at least one TV signal receiver according to the invention, in which the TV signal receiver comprises a memory for delaying the received first TV signal.

Fig. 1 shows diagrammatically a system 1 comprising a broadcaster 3 and service provider 4 and a TV signal receiver 5. In practice, more than one TV signal receiver will be connected to the broadcaster 3 and service provider 4. The TV signal receiver 5 has a first input terminal 7, a second input terminal 8 and an output terminal 9. The TV signals transmitted by the broadcaster 3 are received at the first input terminal 7 of the TV signal receiver 5. These signals will be further referred to as the first input signal. The signals comprising commercials or other information, transmitted by the service provider 4 are received at the second input terminal 7 of the TV signal receiver 5. These signals will be further referred to as the second input signal. The first input signal relates to the first TV signals, in other words, the main programs. These first TV signals have interruptions. The second input signal relates to the second TV signal blocks comprising information such as

commercials, stock exchange news, the weather forecast, or commercials on given subjects, etc. The content of such information, however, often considered being too diverse by the user who wishes to receive, for example only information about given subjects. It is an object of the invention to provide a solution in this respect.

5               The first input signal received at the input terminal 7 is applied to a tuner 11, so that a first TV signal is selected from the presented first TV signals. The first TV signal is applied to a first input 27 of a signal combination unit 19. The second input signal received at the second input terminal 8 is applied to a storage device 17. The storage device 17 is adapted to retrieve second TV signal blocks from the second input signal and to store the second TV  
10   signal blocks in a memory. The TV signal receiver further comprises user activatable input means 23 arranged for receiving a first command to be supplied to a control unit 25. The input means can be in the form of buttons on the TV signal receiver or a remote control, but can also be voice controlled input means. The control unit 25 is adapted to generate a first control signal in dependence of said first command. The storage device 17 is further adapted to read in  
15   dependence of the first control signal, at least one second TV signal block from the memory for supplying to a second input 29 of the signal combination unit 19. The signal combination unit 19 is adapted to replace a part of the first TV signal by the second TV signal so as to obtain a composite TV signal in response to said first control signal. The composite TV signal is applied to an output terminal 9 of the TV signal receiver. On a display device, not shown  
20   and not necessary a part of the TV signal receiver, the composite TV signal is reproduced.

              The functioning of the TV signal receiver will now be described in greater detail. The second input terminal 8 receives the second input signal applied by a service provider. The second input signal may be supplied via a telephone line, a cable, terrestrial connection or satellite connection. In dependence of the subscription to the service provider,  
25   the second input signal comprises second TV signal blocks related to said subscription. In this way, the user indicates globally the kind of second TV signal blocks he want to receive. The storage device 17 derives the second TV signal blocks from the second input signal and stores said blocks in a memory. The first input terminal 7 receives a first input signal applied by the broadcaster. The first input signal may be supplied via a cable connection, terrestrial  
30   connection or satellite connection. In general the first input signal comprises a lot of first TV signals representing TV channels comprising TV programs. The tuner 11 selects a desired first TV signal from the first input signal. In normal operation the first TV signal is applied to the output terminal 9 via the signal combination unit 19. Generally, the first TV signal comprises TV programs such as movies, documentaries, news, weather forecast, introductions to TV

programs, commercials etc. If the viewer regards a part of the first TV signal not interesting, he can apply to the user activatable input means 23 a first command. In dependence of the first command the control unit 25 generates the first control signal. In dependence of the first control signal the storage device reads a second TV signal block. The second TV signal block is applied to the signal combination unit 19. In dependence of the first control signal the signal combination unit 19 replaces said uninteresting part of the first TV signal by said second TV signal block applied by the storage device 17 to obtain a composite TV signal. The composite TV signal is reproduced on a display device coupled to the TV signal receiver. The signal combination unit 19 may be adapted to replace the whole images in the first TV signal by the images of the second TV signal block, but could also be adapted to generate a composite signal comprising images, whereby the images of the second TV signal block replace only a part of the images of the first TV signal, for example, as a picture in picture image. By doing so, the user is able to increase the viewing pleasure.

When using a connection with the service provider with a low bandwidth, for example a telephone line, the data capacity of said connection is not sufficient to receive many second TV signal block comprising video streams in an efficient way. On the other hand, the first input signal has enough data capacity to carry many video streams. Therefore, the service provider sends control information in the second input indicating that via the first input signal a second TV signal block is transmitted. The TV signal receiver receives the second input signal and derives said control information from the second input signal. The storage device 17 is adapted to extract a second TV signal block from the first input signal in dependence of said control information. A second TV signal block extracted from the first input signal could be part of the first TV signal, but could also be part of another TV signal in the first input signal.

The TV signal receiver 5 is preferably provided with means to obtain a user profile. The user profile is used to be able to read only those second TV signal blocks from memory that have preference for the viewer. However, this user profile may be obtained in different manners.

In an embodiment having a first possibility to obtain the user profile, the TV signal receiver may be provided with user activatable input means 23 for presenting a user profile of themes or subjects about which information is desired. The user profile may be used by the storage device to store only those second TV signal blocks in the memory, which correspond to the user profile. The user profile acts as a filter for the information to be stored in the memory. This method has the advantage that not all the received second TV signal

blocks will be stored in the memory and thus less memory is needed to store the second TV signal blocks. The user profile could also be used to select second TV signal blocks stored in the memory to be read.

5 The user activatable input means 23 may further be adapted to receive a second command from the user. The control unit 25 is adapted to generate a second control signal in dependence of the second command. The storage device is adapted in dependence of the second control signal to stop reading a second TV signal block from the memory and to read another second TV signal block from the memory to be supplied to the signal combination unit 19. In this way, the user is able to stop viewing a second TV signal block that is  
10 uninteresting for the user and to view another second TV signal block.

Figure 2 shows an embodiment of a system provided with a broadcaster, a service provider and at least one TV signal receiver according to the invention, in which second possibility to obtain a profile is illustrated. The TV signal receiver comprises a first detector 31. The first detector detects characteristics of parts of the first TV signal, such as  
15 theme, subject, kind of commercial or product promoted. The detected characteristic is applied to a unit 33. The first detector may be adapted to detect more then one characteristic of a part of the first TV signal, such as an interruption. The unit 33 counts the number of times an interruption with a determined characteristic is detected by the first detector 31. These counting values do give information about the number of times that the user could view an  
20 interruption with a specific characteristic. Further the unit 33 counts the number of times an interruption with said determined characteristic is replaced by a second TV signal blocks. These counting values do give information about the number of times that an interruption with a specific characteristic was regarded as being uninteresting for the user. The relationship between the number of times interruptions with a specific characteristic are detected in the  
25 first TV signal and the number of times interruptions with said specific characteristic are replaced is an indication of the kind of interest of the user. This information is used to obtain the user profile. In this way the user profile is obtained automatically from the viewing behavior and thus the needs of the user. Another advantage is that the user profile changes automatically with a change in the needs of the user.

30 A second detector 35 may be provided to obtain more accurately the user profile automatically from the viewing behavior of the user. The second detector 35 detects a characteristic of the second TV signal blocks read from the memory. Characteristics of a second TV signal block may be the theme, the subject, the kind of commercial or the product promoted. The second detector 35 may be adapted to detect more then one characteristic of a

second TV signal block. The detected characteristic is applied to the unit 33. The unit 33 is further adapted to count the number of times a second TV signal block with a determined characteristic is detected by the second detector 35. These counting values do give information about the number of times that the user could view a second TV signal block with a specific characteristic. Further the unit 33 counts the number of times the reading of a second TV signal block with said determined characteristic is stopped by receiving the second command from the user. The thus obtained information is used to determine more accurate the user profile by taking into account the relevance for the user of the outputted second TV signal blocks.

Figure 2 shows further the possibility of transmitting the user profile to the service provider. Therefore, the TV signal receiver is provided with an output terminal 37. The transmission of the user profile may be done via a telephone line, cable network, terrestrial connection or satellite connection. An advantage of transmitting the user profile to the service provider is that the service provider is able to send to the TV signal receiver 5 second input signals comprising second TV signal block having characteristics corresponding to the user profile. In this way, the storage device is not necessarily able to select the second TV signal blocks in dependence of the user profile and to store only the selected second TV signal block, as the received second TV signal blocks already correspond to the user profile.

Figure 3 shows a further embodiment of the system in figure 2. The TV signal receiver is provided with third detector 39. The third detector detects an event whereby the first TV signal is continued after an interruption and applied to the first input 27 of the signal combination unit 19, while also a second TV signal block read from the storage device is applied to the second input 29 of the signal combination unit 19. After detecting said event, the third detector generates an indication signal for supplying to a second output terminal 41 of the TV signal receiver 5. The indication signal can be used to signal the user that the program in the first TV signal after the interruption is resumed, as a result of which the user will not be able to view said program when continuing viewing the second TV signal block. The indication signal can be an acoustic signal or on the form of a warning message to be displayed on a TV screen. The user activatable input means 23 are further adapted to receive a third command. In dependence of the third command the control unit 25 generates a third control signal to order the storage unit 17 to stop reading the second TV signal block from the memory.

The TV signal receiver in figure 3, further, comprises a writing unit 43 for writing the first TV signal in a second memory 45 and a reading unit 47 for reading the first



TV signal from the memory to obtain a delayed version of the first TV signal for supplying to the signal combination unit 19. The indication signal generated by the third detector 29 is applied to the reading unit 47. The reading unit is adapted to inhibit reading the first TV signal from the second memory 45 in response to said indication signal and to resume reading the first TV signal, when no longer a second TV signal block is read from the first memory, which is indicated by the first and second control signal. In this manner, a second TV signal block read from the memory can always be displayed completely on the TV screen, without missing the beginning part of a TV program received while the second TV signal block was outputted. Said event happens when the duration of a second TV signal block is longer than the remaining time of an interruption in the first TV signal. When the third detector 39 detects the end of an interruption in the signal supplied to the signal combination unit, while a second TV signal block is supplied to the signal combination unit 19, the reading unit 47 inhibits reading the first TV signal from the second memory 45. After detecting that the second TV signal block is completely received at the second input 29 of the signal combination unit 19, the reading unit 47 resumes reading the first TV signal from the second memory and supplies a delayed version of the first TV signal to the signal combination unit 19.

In the above-described embodiments the second TV signal blocks are automatically and at random read from the memory. There might be a need to select the second TV signal blocks to be read from the memory under direct control of the user. Therefor, the user activatable input means 23 could further be adapted to select a second TV signal block stored in the storage device for being read from the storage device. The storage device 17 is adapted to generate a list comprising information about the stored second TV signal blocks. Said list could be arranged according to determined characteristics of second TV signal blocks. An entry in the list may comprise a specific characteristic and references to at least one second TV signal blocks having said specific characteristic. After selection of an entry in the list having a requested characteristic, a second TV signal block referred to, is read from the memory and supplied to the signal combination unit 19. In this way, the user is able to select a second TV signal block that is desired to be viewed on that specific moment.

Further, the storage device 17 may be adapted to generate said list in dependence of the content of the first TV signal. By taking into account the characteristic of the first TV signal to be replaced, a list comprising references to second TV signal blocks having a relationship with said characteristic is generated. For example, if the user desires to replace a commercial in the first TV signal, a list is generated comprising only the stored

commercials, whereby the user can select only a commercial to replace said commercial in the first TV signal.

Whilst the invention is described with reference to preferred embodiments thereof, it is to be understood that these are not limiting examples. Thus various modifications  
5 may become apparent to those skilled in the art, without departing from the scope of the invention, as defined by the claims. As an example, the first and second input terminal could be the same terminal to be connected to for example a cable network. The first detector for detecting a characteristic of an interruption, could next to information obtained from the first TV signal, make use of information retrieved from the service provider, such as an electronic  
10 program guide to detect a characteristic. Further, the invention may also be incorporated in a video recorder. The interruptions in the recorded first TV signal can during reproduction be replaced by up to date information.

The word 'comprising' does not exclude the presence of other elements or steps than those listed in a claim. Any reference signs do not limit the scope of the claims. The  
15 invention can be implemented by means of both hardware and software. Several "means may be represented by the same item of hardware. Further the invention lies in each and every novel feature or combination of features.

## CLAIMS:

1. A TV signal receiver having a first input terminal for receiving a first input signal, a tuner for deriving a first TV signal from the first input signal, wherein said first input signal may comprise interruptions interrupting said first TV signal, a storage device for storing and reading at least a plurality of second TV signal blocks in/from a memory, control means  
5 for generating a first control signal for controlling the storage device to read at least one second TV signal block from the memory to obtain a second TV signal, signal combination unit for replacing a part of the first TV signal by the second TV signal so as to obtain a composite TV signal in response to said first control signal, and further having an output terminal for supplying the composite TV signal,  
10 characterized in that the TV signal receiver further comprises a second input terminal for receiving a second input signal, whereby the storage device is adapted to a derive second TV signal block in dependence of the second input signal and for storing said second TV signal block in the memory, and user activatable input means for receiving a first command to be supplied to the control means in order to generate the first control signal.  
15
2. A TV signal receiver as claimed in claim 1, characterized in that the storage device further is adapted to derive the second TV signal block from the first TV signal in dependence of the second input signal.
- 20 3. A TV signal receiver as claimed in claim 1 or 2, characterized in that the storage device is further adapted to read at least one second TV signal block in dependence of a user profile.
4. A TV signal receiver as claimed in claim 3, characterized in that the user  
25 activatable input means further are adapted to receive the user profile.
5. A TV signal receiver as claimed in any of the preceding claims, characterized in that the TV signal receiver further comprises first detection means for detecting a characteristic of an interruption and first means for keeping up statistical information about the

number of times an interruption with the specific characteristic is detected and the number of times said interruption is at least partially replaced, to obtain the user profile.

6. A TV signal receiver as claimed in any of the preceding claims, characterized in that the user activatable input means are further adapted for receiving a second command to be supplied to the control means in order to generate a second control signal, and the storage device is further adapted to stop reading the at least one second TV signal block from the memory and to read at least another second TV signal block from the memory in dependence of the second control signal.

7. A TV signal receiver as claimed in claim 6, characterized in that the TV signal receiver further comprises second detection means for detecting a characteristic of a second TV signal block, wherein the first detection means are further adapted for keeping up statistical information about the number of times a second TV signal block with the specific characteristic is completely read from the storage device and the number of times said second TV signal block with the specific characteristic is partially read from the storage device, to obtain the user profile.

8. A TV signal receiver as claimed in claim 3, 4, 5, 6 or 7, characterized in that the TV signal receiver further comprises output means for transmitting the user profile.

9. A TV signal receiver as claimed in claim 5, 6, 7 or 8, characterized in that the TV signal receiver further comprises output means for transmitting the statistical information.

10. A TV signal receiver as claimed in any of the preceding claims, characterized in that the TV signal receiver further comprises third detection means for detecting an event whereby said first TV signal is continued after an interruption while a second TV signal block is read from the memory and output means for generating an indication signal in dependence of the detection of said event.

11. A TV signal receiver as claimed in claim 10, characterized in that the indication signal is an acoustic signal.

12. A TV signal receiver as claimed in claim 10, characterized in that the indication signal is in the form of a warning message to be displayed on a TV screen.

13. A TV signal receiver as claimed in claim 10, 11 and 12, characterized in that the user activatable input means are further adapted for receiving a third command to be supplied to the control means in order to generate a third control signal, and the storage device is further adapted to stop reading the at least one second TV signal block from the memory in dependence of said third control signal.

14. A TV signal receiver as claimed in any of the preceding claims, characterized in that the TV signal receiver further comprises a second memory, writing means for storing the first TV signal in said second memory, and reading means for reading a delayed version of the first TV signal from said second so as to enable a delayed supply of said first TV signal to said signal combination unit.

15. A TV signal receiver as claimed in claim 14, characterized in that the second memory being controlled so as to inhibit outputting of the first TV signal in response to said indication signal and to resume outputting of the first TV signal in response to said first and second control signal.

16. A TV signal receiver as claimed in any one of the preceding claims, characterized in that the memory is a magnetic record carrier.

17. A TV signal receiver as claimed in claim 16, wherein the magnetic record carrier is a hard disk.

18. A TV signal receiver as claimed in claim 16, wherein the magnetic record carrier is a longitudinal magnetic recording medium.

19. A TV signal receiver as claimed in any one of claims 1 to 15, wherein the memory is a solid-state memory.

20. A TV signal receiver as claimed in any of the preceding claims, characterized in that the storage device is adapted to generate a list comprising information of at least a part of

the second TV signal blocks stored in the memory, whereby the user activatable input means further are adapted to select from said list a second TV signal block stored in the memory, for being read from said memory.

- 5 21. A TV signal receiver as claimed in claim 20, characterized in that the storage device is adapted to generate said list in dependence the first TV signal.

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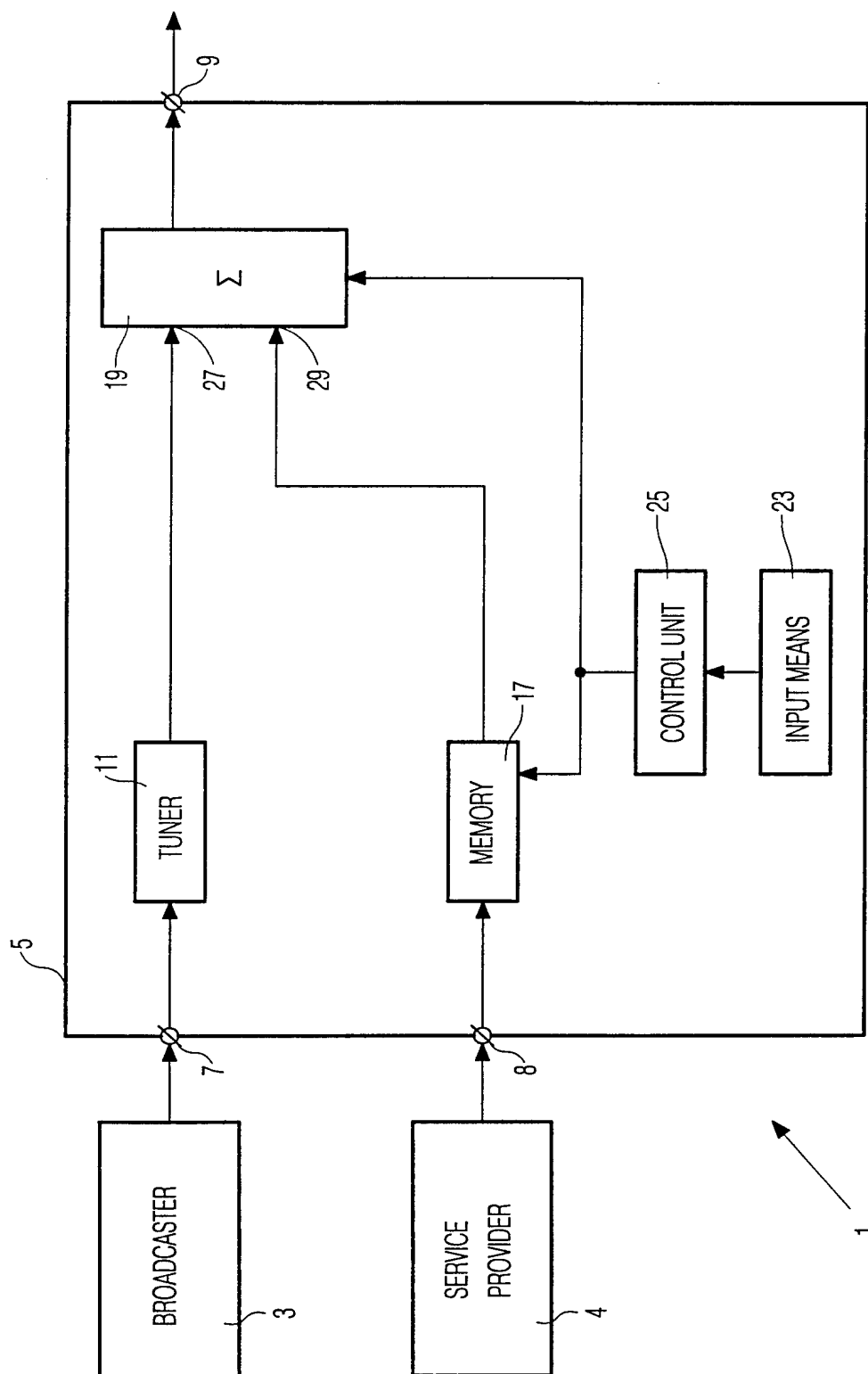


FIG. 1

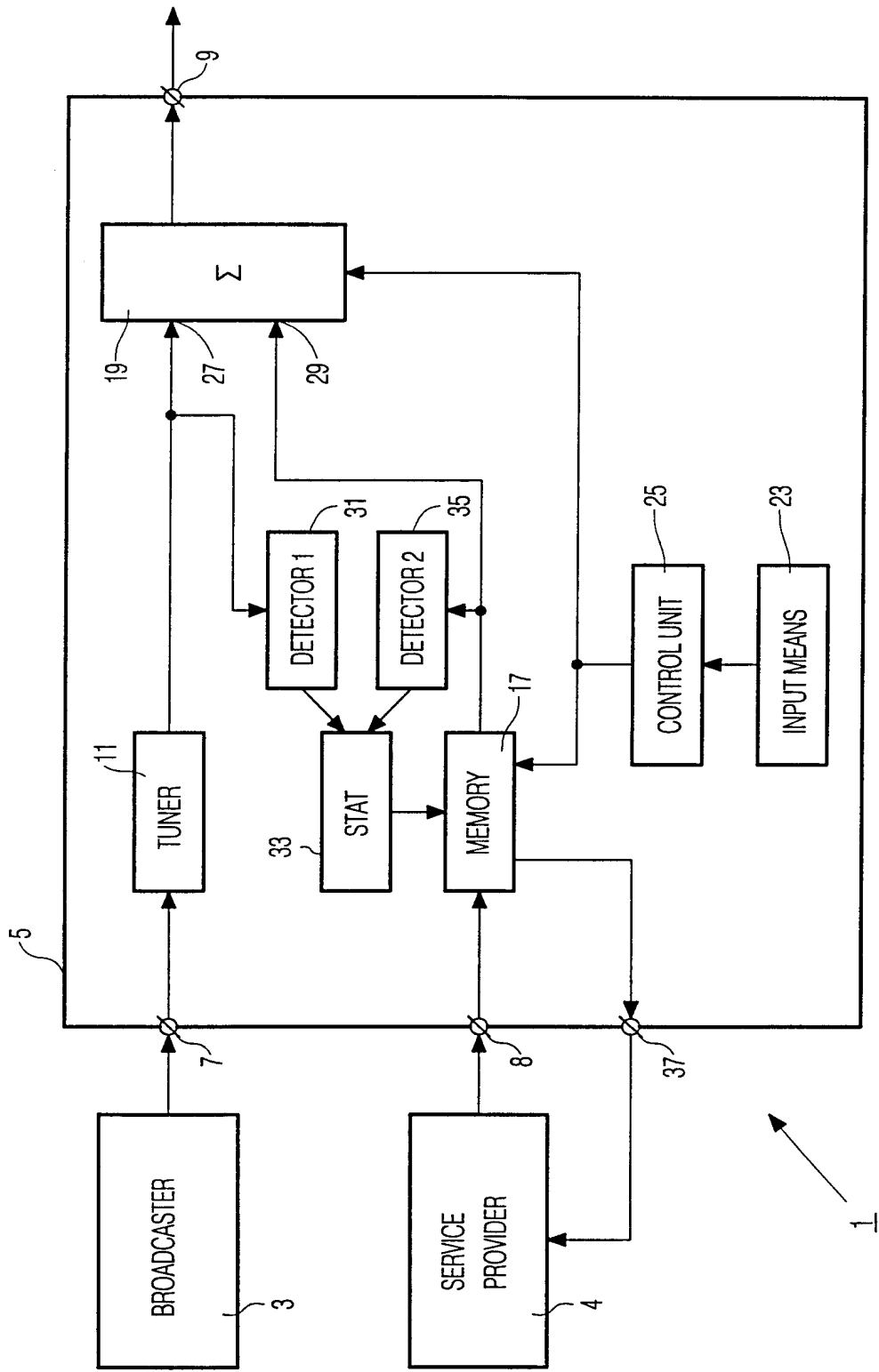


FIG. 2



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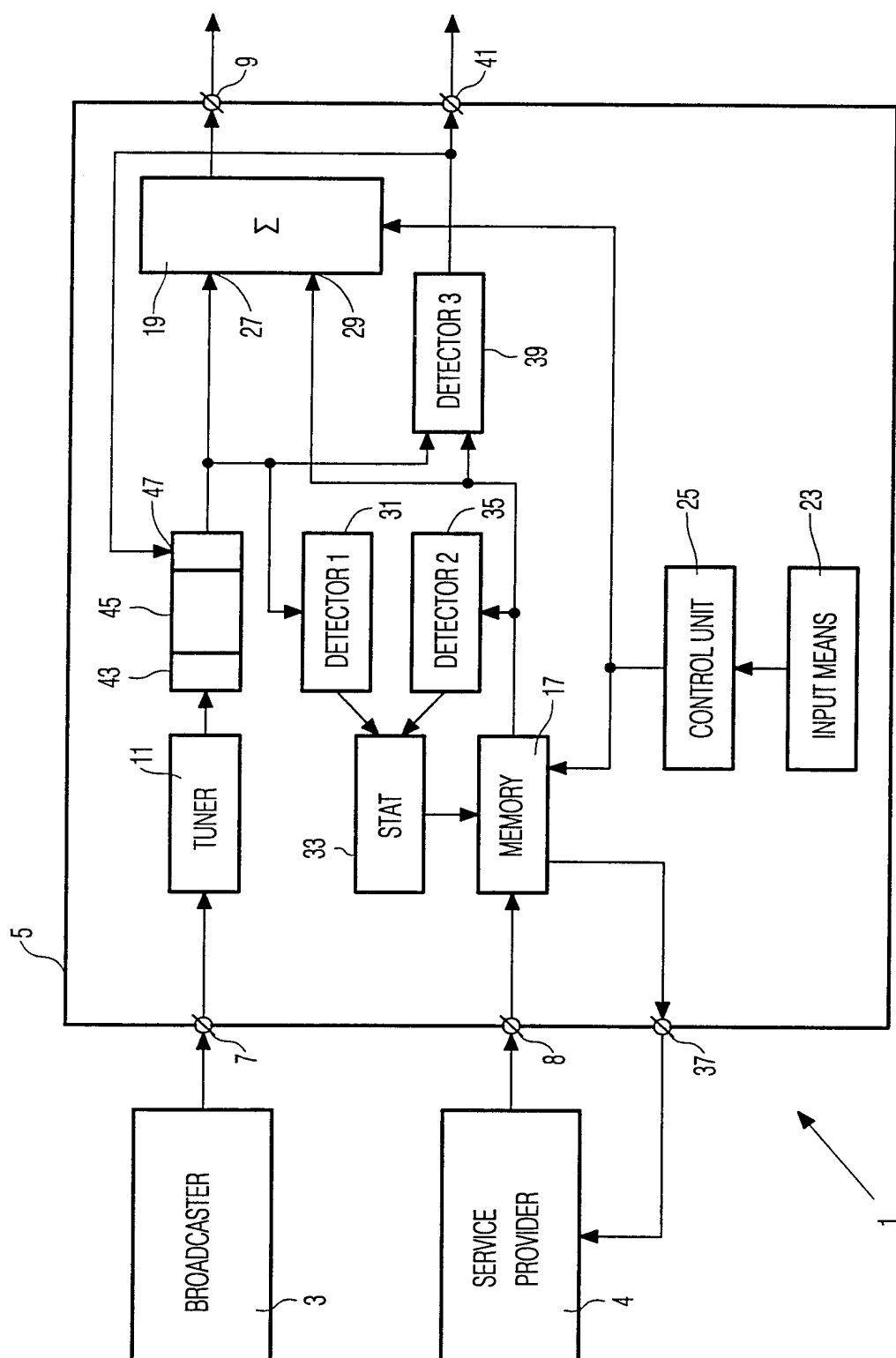


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/06818

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H04N5/45 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search

19 October 2000

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Name and mailing address of the ISA

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Materne, A

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/06818

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